

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

Claim 1 (Canceled)

Claim 2 (Currently Amended) ~~The method of Claim 1, wherein the step of~~
A method for tracking an object in an image using Fast Fourier Transforms,
comprising:

identifying a background correction term for a Fast Fourier Transform
correlation tracker; and

tracking the object based on a representation of the background correction
term that includes a frequency domain sinc function;

wherein the tracking comprises the steps of: includes zero-padding a
reference window to a size of a search window, performing a 2 dimension Fast
Fourier Transform of the zero-padded reference window into the frequency domain,
and taking a complex conjugate of the transformed zero-padded reference window;
window, performing a 2 dimension Fast Fourier Transform of a search window
window, performing a complex multiplication of the complex conjugate of the
transformed zero-padded reference window and the transformed search window,
and multiplying the result by a first factor to obtain a first result in the frequency
~~domain;~~ domain, squaring pixel values of the search window and performing a 2
dimension Fast Fourier Transform of the squared pixel values into the frequency

~~domain;~~ domain, multiplying the transform of the squared pixel values with a sinc function to obtain a second result in the frequency ~~domain;~~ domain, summing the first and second results to form a third result in the frequency ~~domain;~~ domain, performing a 2 dimension inverse Fast Fourier Transform of the third result to obtain a spatial-domain correlation ~~surface;~~ surface, and searching for a minimum of the correlation surface.

Claim 3 (Original) The method of Claim 2, wherein the first factor is -2.

Claim 4 (Original) The method of Claim 2, wherein the sinc function is a 2 dimension sinc function.

Claim 5 (Original) The method of Claim 4, wherein the sinc function is pre-stored.

Claim 6 (Original) The method of Claim 2, wherein in the step of searching for a minimum of the correlation surface, border areas which have edge effect caused by window operation, are excluded.

Claim 7 (Currently Amended) ~~The method of Claim 1, wherein the step of tracking comprises the steps of:~~

A method for tracking an object in an image using Fast Fourier Transforms, comprising:

identifying a background correction term for a Fast Fourier Transform
correlation tracker; and
tracking the object based on a representation of the background correction
term that includes a frequency domain sinc function;
wherein the tracking includes zero-padding a reference window to a size of a
search window, performing a 2 dimension Fast Fourier Transform of the zero-
padded reference window into the frequency domain, and taking a complex
conjugate of the transformed zero-padded reference ~~window~~; window, performing a
2 dimension Fast Fourier Transform of a search ~~window~~; window, performing a
complex multiplication of the complex conjugate of the transformed zero-padded
reference window and the transformed search window, and multiplying the result by
a first factor to obtain a first result in the frequency ~~domain~~; domain, obtaining a
search window function by squaring pixel values of the search ~~window~~; window,
performing a 2 dimension Fast Fourier Transform of the search window function into
the frequency ~~domain~~; domain, multiplying the transform of the search window
function with a sinc function to obtain a second result in the frequency ~~domain~~;
domain, summing the first and second results to form a third result in the frequency
~~domain~~; domain, performing a 2 dimension inverse Fast Fourier Transform of the
third result to obtain a spatial-domain correlation ~~surface~~; surface, and searching for
a minimum of the correlation surface.

Claims 8-11 (Canceled)

Claim 12 (Currently Amended) ~~The tracker of Claim 11,~~ A Fast Fourier Transform correlation tracker, comprising:

a computing device with inputs for receiving an input search window image and receiving a reference window image, wherein the computing device tracks the reference window image in the input search window image based on a frequency domain background correction term that includes a 2 dimension sinc function,
wherein the tracker:

zero-pads a reference window to a size of a search window, performs a 2 dimension Fast Fourier Transform of the zero-padded reference window into the frequency domain, and takes a complex conjugate of the transformed zero-padded reference window;

performs a 2 dimension Fast Fourier Transform of a search window;

performs a complex multiplication of the complex conjugate of the transformed zero-padded reference window and the transformed search window, and multiplies the result by a first factor to obtain a first result in the frequency domain;

squares pixel values of the search window and performs a 2 dimension Fast Fourier Transform of the squared pixel values into the frequency domain;

multiplies the transform of the squared pixel values with a sinc function to obtain a second result in the frequency domain;

sums the first and second results to form a third result in the frequency domain;

performs a 2 dimension inverse Fast Fourier Transform of the third result to obtain a spatial-domain correlation surface; and

searches for a minimum of the correlation surface.

Claim 13 (Currently Amended) ~~The tracker of Claim 11,~~ A Fast Fourier Transform correlation tracker, comprising:

a computing device with inputs for receiving an input search window image and receiving a reference window image, wherein the computing device tracks the reference window image in the input search window image based on a frequency domain background correction term that includes a 2 dimension sinc function,

wherein the tracker:

zero-pads a reference window to a size of a search window, performs a 2 dimension Fast Fourier Transform of the zero-padded reference window into the frequency domain, and takes a complex conjugate of the transformed zero-padded reference window;

performs a 2 dimension Fast Fourier Transform of a search window;

performs a complex multiplication of the complex conjugate of the transformed zero-padded reference window and the transformed search window, and multiplies the result by a first factor to obtain a first result in the frequency domain;

obtains a search window function by squaring pixel values of the search window;

performs a 2 dimension Fast Fourier Transform of the search window function into the frequency domain;

multiplies the transform of the search window function with a sinc function to obtain a second result in the frequency domain;

sums the first and second results to form a third result in the frequency domain;

performs a 2 dimension inverse Fast Fourier Transform of the third result to obtain a spatial-domain correlation surface; and

searches for a minimum of the correlation surface.